Remarks

Claims 1-47 are pending.

Rejection of Claims under 35 U.S.C. § 101

Claims 28-40 stand rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter because the claimed computer readable medium "encompasses communications medium conveying signals, which are non-statutory." The applicants respectfully traverse this rejection.

The applicants note that claims 28-40 are directed to functional descriptive material encoded on a *computer readable medium*, and that computer readable medium is at least one of an electronic storage medium, a magnetic storage medium, an optical storage medium, and a communications medium conveying signals encoding the instructions.

First, to the extent the applicants have claimed a communications medium conveying signals encoding the instructions that is a *computer readable medium*, the applicants have claimed a sufficiently tangible embodiment, i.e., a computer readable medium must be tangible for it to be readable by a physical device such as a computer.

Second, as noted in the Examination Guidelines for Computer-Related Inventions, "[w]hen functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases." MPEP §2106, page 2100-12. Furthermore, "[c]laims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena . . . . However, a signal claim directed to a practical application of electromagnetic energy is statutory regardless of its transitory nature." MPEP §2106, page 2100-14, citing *O'Reilly v. Morse*, 56 U.S. (15 How) 62, 114-119 (1853) and *In re Breslow*, 616 F.2d 516, 519-21, 205 USPQ 221, 225-26 (CCPA 1980), emphasis added. Claims 28-40 are clearly directed to more than simply the physical characteristics of a form of energy, as indicated by the description of the instructions that have been encoded on the computer readable communications medium. Furthermore,

such instances of the claims where the computer readable medium is a communications medium conveying signals encoding instructions are practical application of, for example, electromagnetic energy due to the encoding of the instructions, which include functional descriptive material, on a carrier wave. Accordingly, claims 28-40 recite statutory subject matter.

Although not specifically referenced by the Examiner, it appears the Examiner is relying on the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (October 26, 2005, "*Guidelines*").

First, the applicants note that the *Guidelines* are not binding law. As the *Guidelines* themselves note, "[t]hese Guidelines do not constitute substantive rulemaking and hence do not have the force and effect of law." *Guidelines*, p. 2. Thus, a rejection based solely on the suggestions set forth in the *Guidelines* are not based on established law regarding the patentability of inventions. Second, the applicants note that the *Guidelines* themselves include a discussion that questions whether signals encoded with functional descriptive material should be excluded under § 101. This discussion emphasizes that a rejection of such subject matter under § 101 does not stand on established law. In particular, the *Guidelines* note the similarity between such signals and patentable computer-readable memory that is encoded with functional descriptive material:

> On the other hand, from a technological standpoint, a signal encoded with functional descriptive material is similar to a computer-readable memory encoded with functional descriptive material, in that they both create a functional interrelationship with a computer. In other words, a computer is able to execute the encoded functions, regardless of whether the format is a disk or a signal. *Guidelines*, p. 57.

Thus, the *Guidelines* themselves point out that good reasons exist to view such subject matter as patentable under § 101. The *Guidelines* note the similarity to computer-readable memory encoded with functional descriptive material in order to acknowledge that signals encoded with functional descriptive material may also be patentable subject matter under § 101.

Still further, the *Guidelines* clearly indicate that they are not a summary of established law, but rather a proposal on which further discussion has been invited. In

view of the above reasoning that supports the patentability of signals encoded with functional descriptive material, the *Guidelines* themselves note that they are far from a final word on this issue. "Public comment is sought for further evaluation of this question." *Id.* The applicants respectfully submits that since the *Guidelines'* proposals regarding the patentability of signals encoded with functional descriptive material are admittedly preliminary suggestions on which comment has been invited, it would be highly improper to view these suggestions as binding law.

Accordingly, the applicants respectfully submit claims 28-40 recite statutory subject matter.

Rejection of Claims under 35 U.S.C. § 102/103

Claims 1, 2, 4-6, 9, 14-16, 18-20, 28, 29, 31-33, 41, and 43 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kolawa et al., U.S. Patent No. 5,842,019 (Kolawa). Claims 3, 7, 8, 17, 21, 22, 30, 34, 35, and 42 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kolawa in view of Abrashkevich et al., U.S. Patent Publication No. 2004/0221120 (Abrashkevich). Claims 9-13, 23-27, 35-40, and 44-47 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kolawa in view of Cantrill, U.S. Patent No. 6,523,141. The applicants respectfully traverse these rejections.

Kolawa fails to teach or suggest a method comprising:

> . . . verifying that the first allocated memory block is a memory leak when the reference to the first allocated memory block is not found in the other allocated memory blocks of the plurality of allocated memory blocks,

as required by independent claim 1, and generally required by independent claims 14, 28, and 41.

Regarding this limitation, the Examiner refers to block 93 of Kolawa. The corresponding description (column 6, lines 7-29) states:

> Referring to FIG. 9, the routine for searching memory space with an optional reset of the "NoLeak" attribute (block 76) is shown. Its purpose is to search the memory space for a pointer variable that points to the memory block in question for detecting a leak. First, the memory space is searched for a pointer to the memory block in question (block 90). If the pointer is found (block 91), the memory block is not leaked and, therefore, the "NoLeak" attribute is reset and no leak error is reported (block 92). If

> no memory block is found (block 91), a leak exists and a leak error is reported (block 93). If it cannot be determined whether a pointer exists, that is, it is "unknown" (block 91), no leak error is reported (block 94). The unknown case occurs when the symbol table is not being used or the memory allocation instruction is not trapped. In the described embodiment, these are options for the dynamic debugging system 13 that can be set by the user. In addition, some dynamic debugging systems employ symbol readers that have not been fully implemented and are only able to sweep some memory blocks. Since all memory blocks are not swept, a conclusive "YES" can only be issued if a pointer is found. Otherwise, the answer is "unknown" at best since all of the memory blocks were not searched.

Thus, while Kolawa does teach determining a leak exists when no memory block is found (block 91), and reporting the leak (block 93), nothing in the cited portion of Kolawa teaches or suggests *verifying* that the first allocated memory block is a memory leak once a reference to the first allocated memory block is not found in the other allocated memory blocks. In other words, Kolawa fails to teach or suggest the additional verification operation upon failing to find the reference, e.g., upon a determination of a possible leak. In fact, the cited portion of Kolawa does not contemplate the need for additional verification. Accordingly, independent claims 1, 14, 28, and 41 are allowable over Kolawa. Claims 2-13, 15-27, 29-40, and 42-47 depend from respective independent claims and are allowable for at least this reason.

Further regarding claims 6, 20, and 33, the Examiner refers to Kolawa's operation 74 in Figure 7. The applicants respectfully disagree. Column 5, lines 40-64 describe a basic process using reference counting. Operation 74 merely indicates a test whether the reference count is zero. Nothing in the cited portion of Kolawa teaches or suggests a determination regarding whether a memory block has been deallocated, or even that a reference count of zero necessarily means a block has been deallocated or that such a determination has been made. Accordingly, the applicants respectfully submit claims 6, 20, and 33 are further allowable over Kolawa.

Further regarding claims 8, 22, and 35, the Examiner refers to paragraph 0074 of Abrashkevich. This paragraph states:

> Having a separate list of allocated memory pools/blocks stored in the heap/pool header allows checking for memory leaks before exiting an application process by scanning the list of allocations. In a preferred embodiment, a special debug option is used during the allocation procedure to specify exactly how a memory block is to be freed: individually (the relevant bit in debug options variable is not set) or when the whole pool to which the block belongs will be freed (the relevant bit is set on). In a preferred embodiment, a special function is used for checking a list of allocated pools and blocks. It is typically called by an application before exit (or return) after freeing memory used for performing some completed task. First the special function determines if option above is set for each memory block from a list of allocated blocks. All blocks for which this option is set are skipped since they will be freed in conjunction with the pool to which they belong to. If the resulting list of allocated blocks scanned is not empty, there is a memory leak (since all memory allocations in a list are supposed to be freed when the function is called except for memory blocks marked to be freed with the pool to which they belong). A list of allocated pools can be scanned as well for memory leaks after completion of a task involving the whole heap. Thus, the memory leak(s) detected can be examined using the debug information in a heap/pool header. Information related to memory allocations involved in the leak (user and actual offsets, user and actual sizes, calling function name or function identifier, source file name, code line number, etc.) can be easily accessed directly from the list, which then may be used to free the allocations causing the leak or to debug the source of the problem. Memory can also be checked periodically for corruption and leaks (not only at the end of a task) and compared with expected data to monitor the memory status and availability of long running applications like databases and networked servers.

While this portion of Abrashkevich describes use of a list of allocated blocks, and how blocks can be freed, it does not teach or suggest examining *free block memory management information* maintained by an operating system. Accordingly, claims 8, 22, and 35 are further allowable over Abrashkevich.

Regarding the contingency chain formed or used in claims 11-13, 25-27, 38-40, and 45-47, the Examiner merely refers to Figures 4A and 4B of Cantrill, without any specific reference to the various operations disclosed therein, or to the several columns of accompanying text. While Figures 4A and 4B generally describe steps associated with reporting memory leaks, there is no teaching or suggestion of (1) contingency chains, (2) use of contingency chains in accordance with the various claims, or (3) anything that

reasonable corresponds to the contingency chains in accordance with the various claims. Accordingly, the applicants respectfully submit claims 11-13, 25-27, 38-40, and 45-47 are further allowable over Cantrill.

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the examiner is requested to telephone the undersigned.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA, 22313-1450, on Nov 20, 2006.

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